

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-14 are be cancelled.

Claims 15-26 are being added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 15-26 are now pending in this application.

**Rejection under 35 U.S.C. § 102**

Claims 1-4, 13, and 14 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,586,537 (Tomisawa et al.). Claims 1-4, 13, and 14 have been cancelled by the above amendment. Withdrawal of this rejection is respectfully requested.

**Rejections under 35 U.S.C. § 103**

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Tomisawa et al. Claim 5 has been cancelled by the above amendment. Withdrawal of this rejection is respectfully requested.

Claims 6-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tomisawa et al. in view U.S. Patent No. 6,886,334 (Shirakawa). Claims 6-8 have been cancelled by the above amendment. Withdrawal of this rejection is respectfully requested.

**New claims 15-26**

New claim 15 requires a combustion control device of an internal combustion engine that includes a fuel injector, a valve that “controls a pilot injection amount and a pilot injection timing of the fuel by the fuel injector,” a sensor that “detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine,” and a programmable controller programmed to “correct a target value of the pilot injection amount and a target value of the pilot injection timing each of which has been defined with respect to a reference fuel, based on the parameter, such that the pilot injection amount is increased while the pilot injection timing is retarded when the specific gravity of the fuel is higher than a specific gravity of the reference fuel; and control the fuel injector so that the target values are realized.”

Tomisawa et al. discloses a fuel property detecting apparatus that includes a control unit 12 that derives a “fuel-injection amount (an injection pulse-width)  $T_i$ ” for a fuel-injection valve 6. See U.S. Patent No. 5,586,537 at col. 6, lines 49-56. Therefore, because Tomisawa et al. teaches a control unit 12 that only derives a fuel-injection amount, Tomisawa et al. does not disclose or suggest a controller programmed to “correct a target value of the pilot injection amount and a target value of the pilot injection timing.” Nor does Tomisawa et al. disclose a controller programmed to perform the claimed corrections “such that the pilot injection amount is increased while the pilot injection timing is retarded when the specific gravity of the fuel is higher than a specific gravity of the reference fuel.” Shirakawa does not remedy the deficiencies of Tomisawa et al. For at least these reasons, claim 15 is allowable over Tomisawa et al. and Shirakawa.

New claim 16 requires a combustion control device of an internal combustion engine that includes a fuel injector, a pressure control valve, a sensor that “detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine,” and a programmable controller programmed to “correct a target value of the fuel injection pressure which has been defined with respect to a reference fuel, based on the parameter, such that the fuel injection pressure is increased when the specific gravity of the fuel is higher than a

specific gravity of the reference fuel; and control the pressure control valve so that the target value is realized.”

Tomisawa et al. discloses a fuel pump and a pressure regulator for fuel-injection valve 6. See U.S. Patent No. 5,586,537 at col. 5, lines 48-51. As noted above, Tomisawa et al. discloses a fuel property detecting apparatus that includes a control unit 12 that derives a “fuel-injection amount (an injection pulse-width)  $T_i$ ” for a fuel-injection valve 6. See U.S. Patent No. 5,586,537 at col. 6, lines 49-56. Tomisawa et al. does not disclose or suggest that the fuel pump or pressure regulator are controlled by the control unit 12 based on “a parameter related to a specific gravity of a fuel burnt by the internal combustion engine.” Nor does Tomisawa et al. disclose or suggest that the fuel pump or pressure regulator are controlled by the control unit 12 “such that the fuel injection pressure is increased when the specific gravity of the fuel is higher than a specific gravity of the reference fuel; and control the pressure control valve so that the target value is realized.” Shirakawa does not remedy the deficiencies of Tomisawa et al. For at least these reasons, claim 16 is allowable over Tomisawa et al. and Shirakawa.

New claim 17 requires a combustion control device of an internal combustion engine that includes a device that “adjusts a compression end in-cylinder temperature of the internal combustion engine,” a sensor that “detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine,” and a programmable controller programmed to “correct a target value of the compression end in-cylinder temperature which has been defined with respect to a reference fuel, based on the parameter; and control the compression end in-cylinder temperature adjusting device so that the target value is realized.”

As noted above, Tomisawa et al. discloses controlling fuel injection amount. To derive a fuel injection amount  $T_i$ , Tomisawa et al. discloses the use of correction factor  $C_o$  that includes “engine-coolant-temperature dependent increasing-correction factor  $K_{TW}$ ” which “is a coefficient necessary to increasingly correct the fuel-injection amount when the coolant temperature  $T_w$  is still low.” Because Tomisawa et al. only discloses the correction of fuel injection amount and the use of a correction factor based upon engine coolant temperature, Tomisawa et al. does not disclose or suggest a programmable controller programmed to

“correct a target value of the compression end in-cylinder temperature which has been defined with respect to a reference fuel, based on the parameter; and control the compression end in-cylinder temperature adjusting device so that the target value is realized.” Shirakawa does not remedy the deficiencies of Tomisawa et al. Claim 18 depends upon claim 17. For at least these reasons, claims 17 and 18 are allowable over Tomisawa et al. and Shirakawa.

New claim 19 requires a combustion control device of an internal combustion engine that includes a device that “adjusts an intake air swirl of the internal combustion engine,” a sensor that “detects a parameter related to a specific gravity of a fuel burnt by the internal combustion engine,” and a programmable controller programmed to “correct a target value of the intake air swirl which has been defined with respect to a reference fuel, based on the parameter; and control the intake air swirl adjusting device so that the target value is realized.”

As noted above, Tomisawa et al. discloses controlling fuel injection amount. Tomisawa et al. does not disclose or suggest a device that “adjusts an intake air swirl of the internal combustion engine.” Nor does Tomisawa et al. disclose or suggest a programmable controller programmed to “correct a target value of the intake air swirl which has been defined with respect to a reference fuel, based on the parameter; and control the intake air swirl adjusting device so that the target value is realized.” Shirakawa does not remedy the deficiencies of Tomisawa et al. Claim 20 depends upon claim 19. For at least these reasons, claims 19 and 20 are allowable over Tomisawa et al. and Shirakawa.

New claim 21 corresponds to previous claim 9 in independent form. Claim 9 was identified as containing allowable subject matter in the previous Office Action. New claims 22-24 depend from claim 21. Therefore, claims 21-24 are allowable over the prior art. New claims 25 and 26 are apparatus and method claims that contain similar limitations to claim 21. Therefore, Applicants believe that claims 25 and 26 are also allowable over the prior art.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

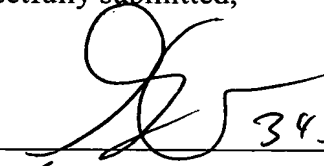
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date

9/29/05

By

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